

Fig. 1

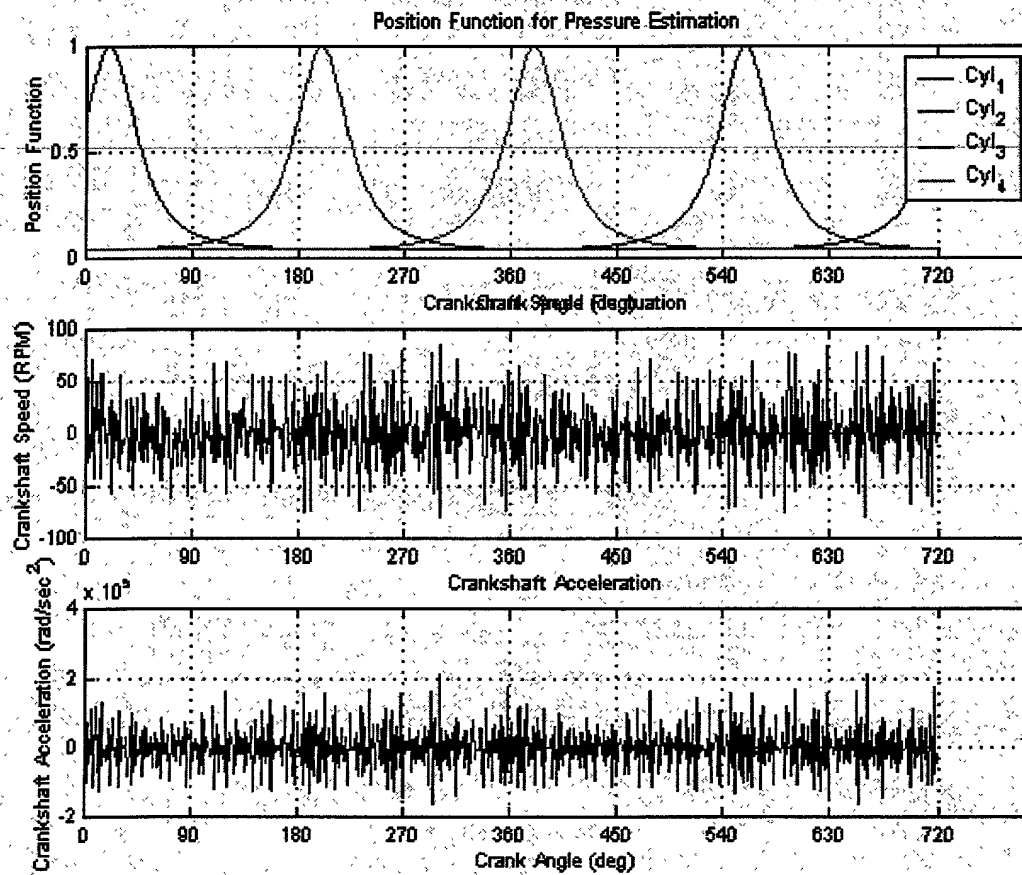


Fig. 2

Measured and Estimated In-Cylinder Pressure.  
Speed = 2000 RPM & Load Torque = 30 lb-ft

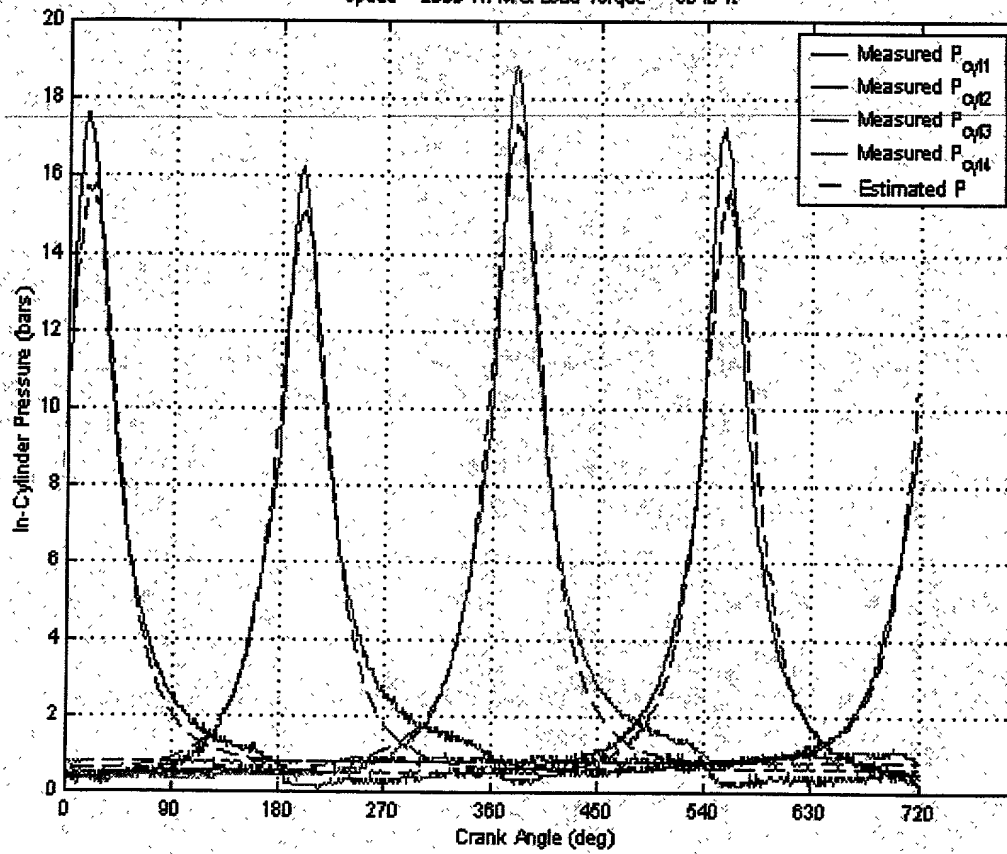


Fig. 3

Measured and Estimated In-Cylinder Pressure,  
Speed = 2000 RPM & Load Torque = 30 lb-ft

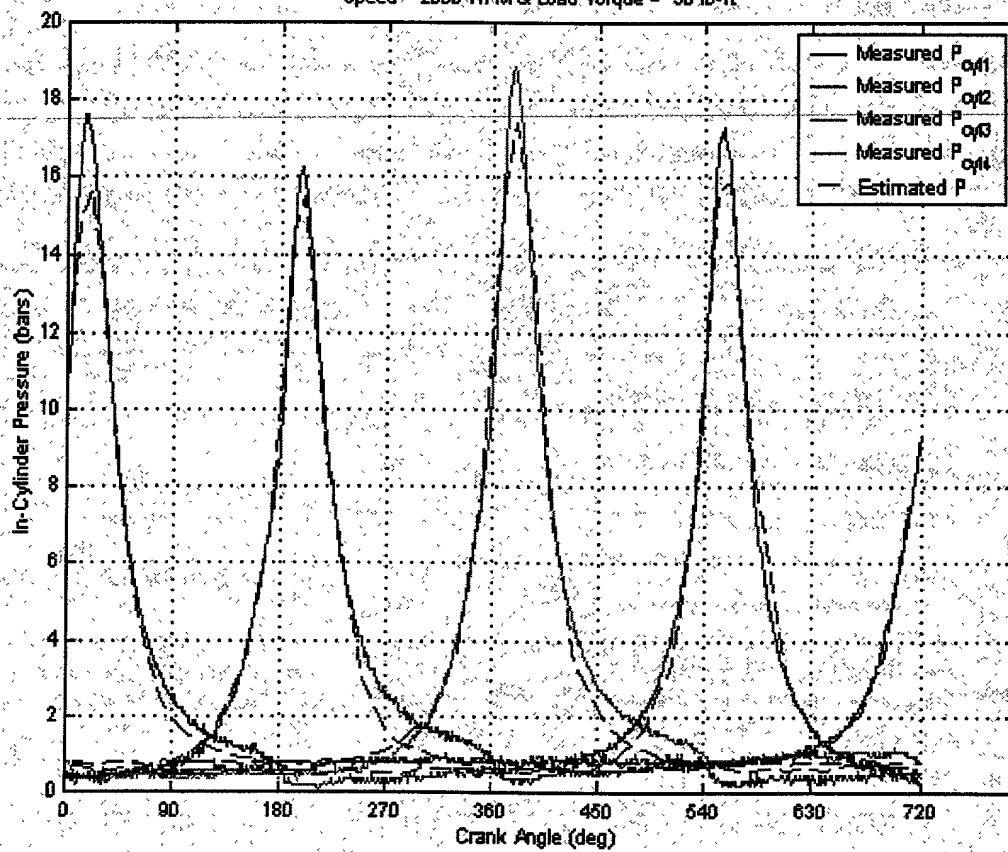


Fig. 4

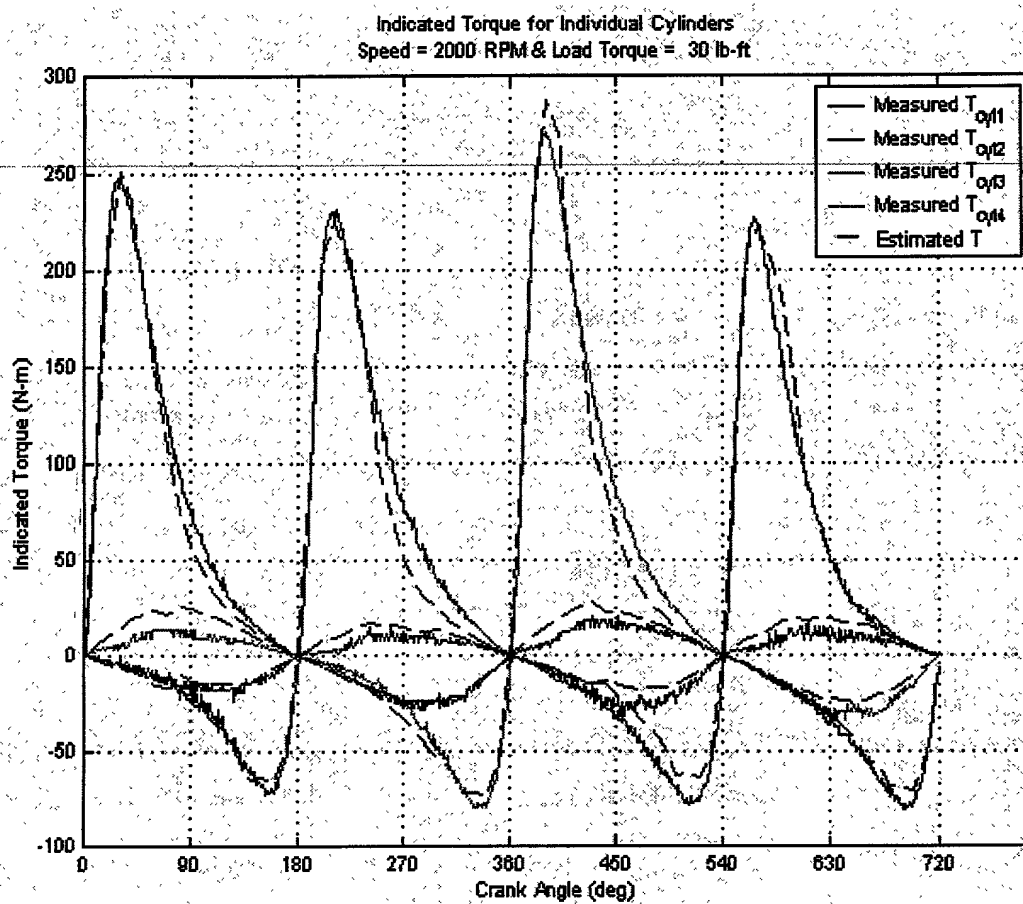


Fig. 5

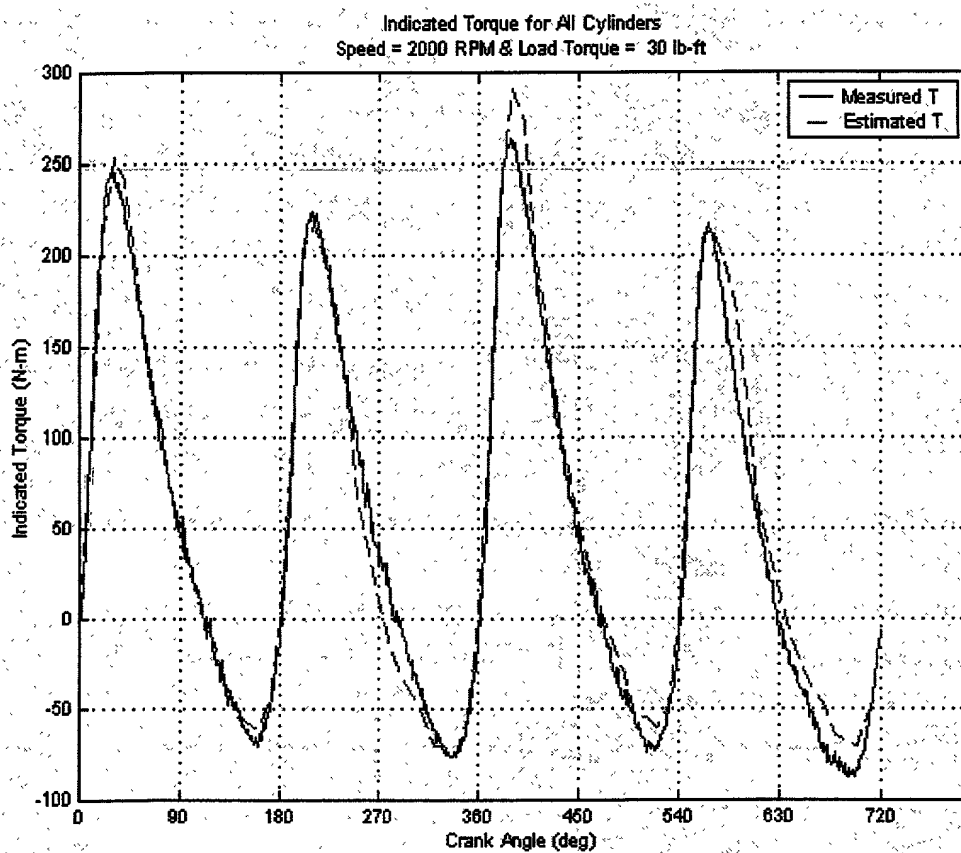


Fig. 6

PART 1: Measured and Estimated Individual-Cylinder Torque,  
Speed = 2000 RPM & Load Torque = 30 lb-ft

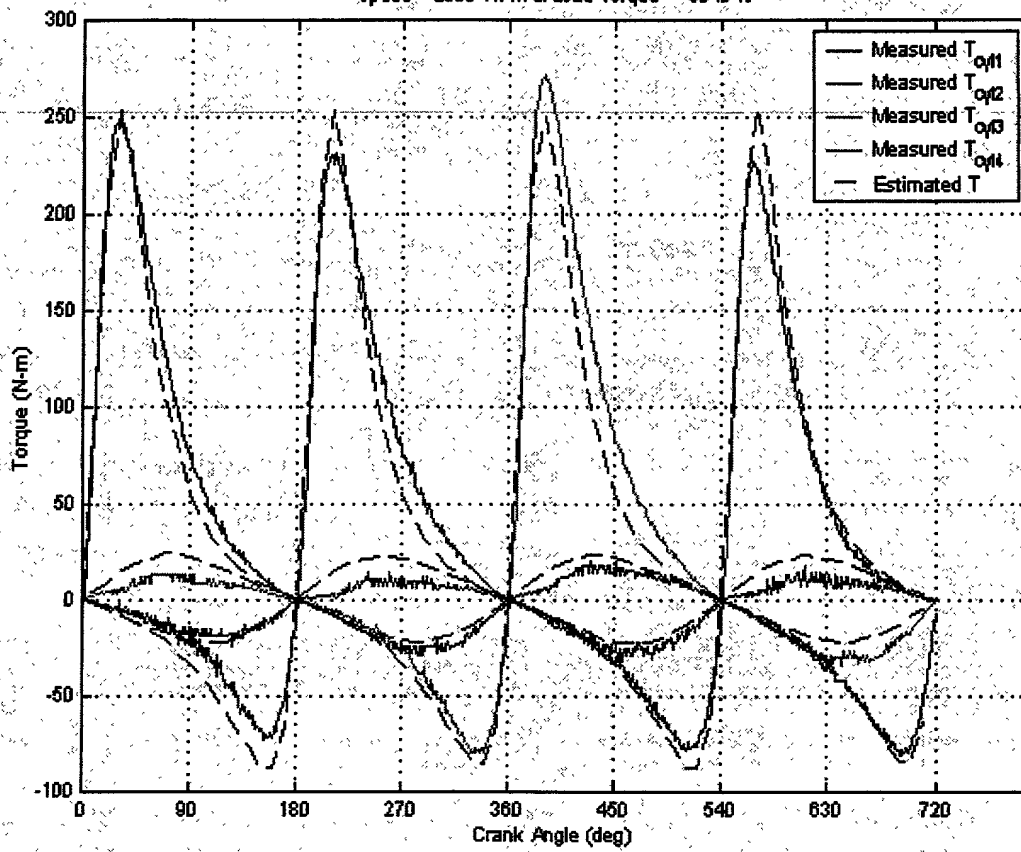


Fig. 7

PART 2: Sum of Individual Cylinder Torque  
Speed = 2000 RPM & Load Torque = 30 lb-ft

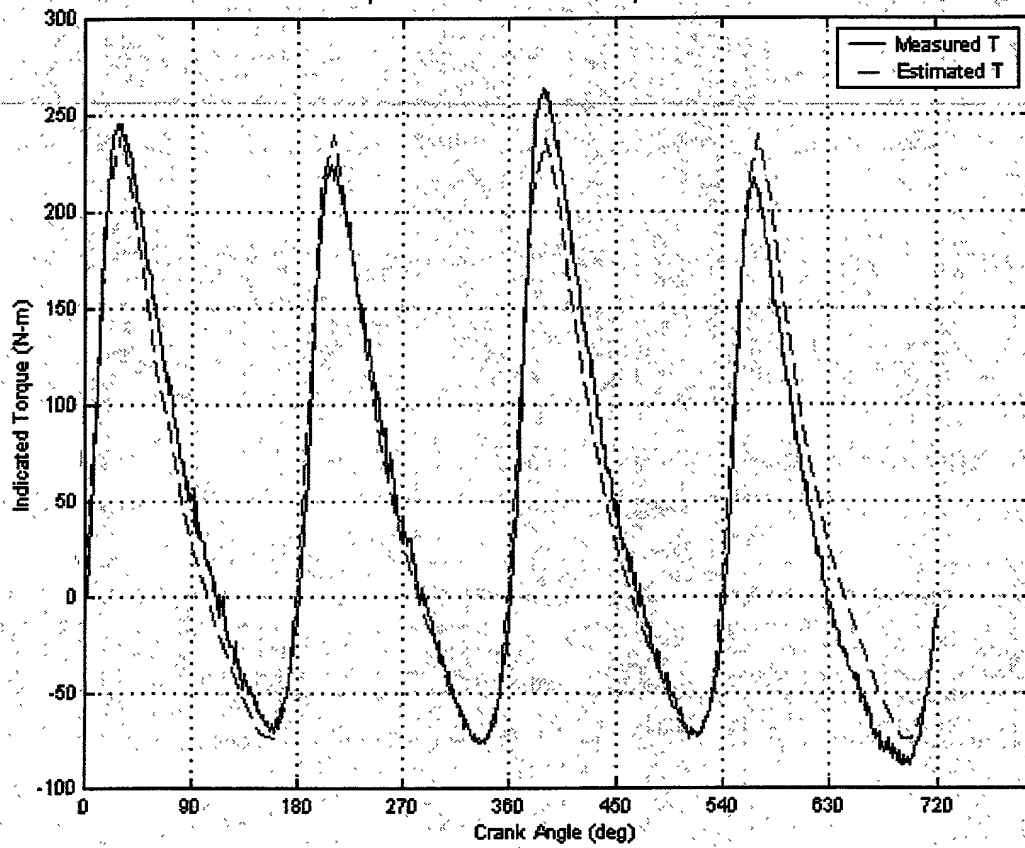


Fig. 8



PART 1: Average Integral of Positive Indicated Torque  
Speed = 2000 RPM & Load Torque = 30 lb-ft

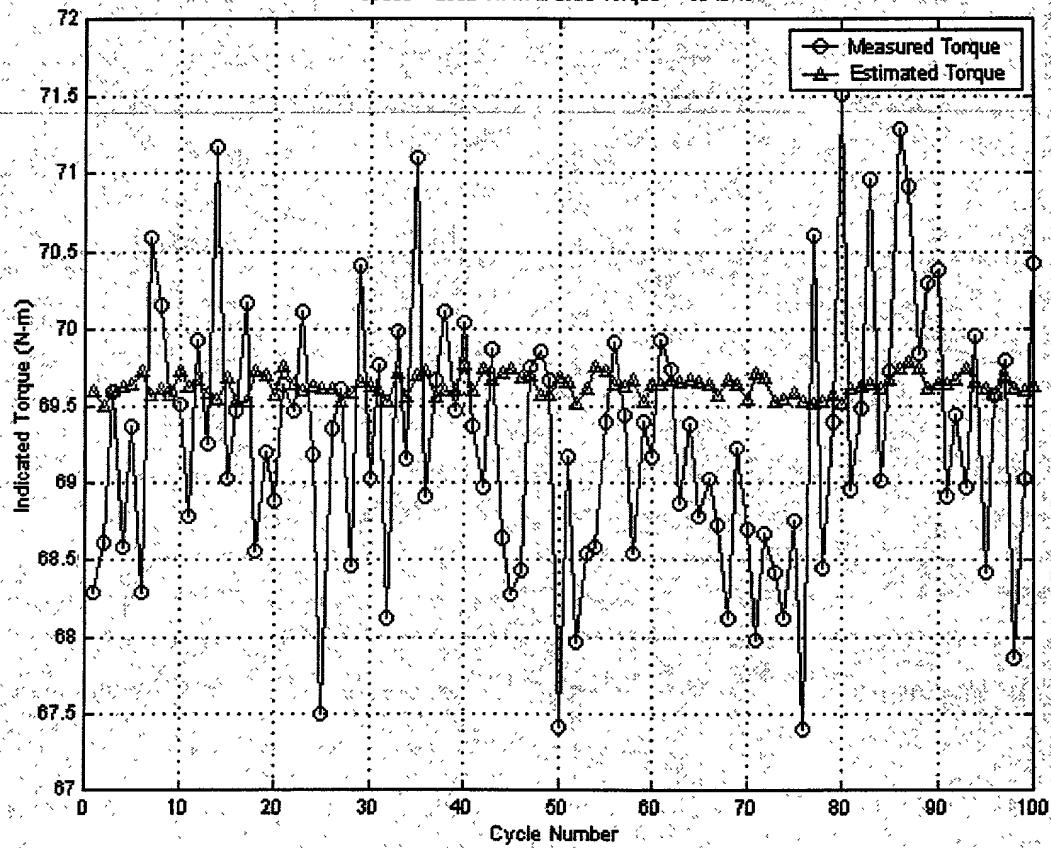


Fig. 9

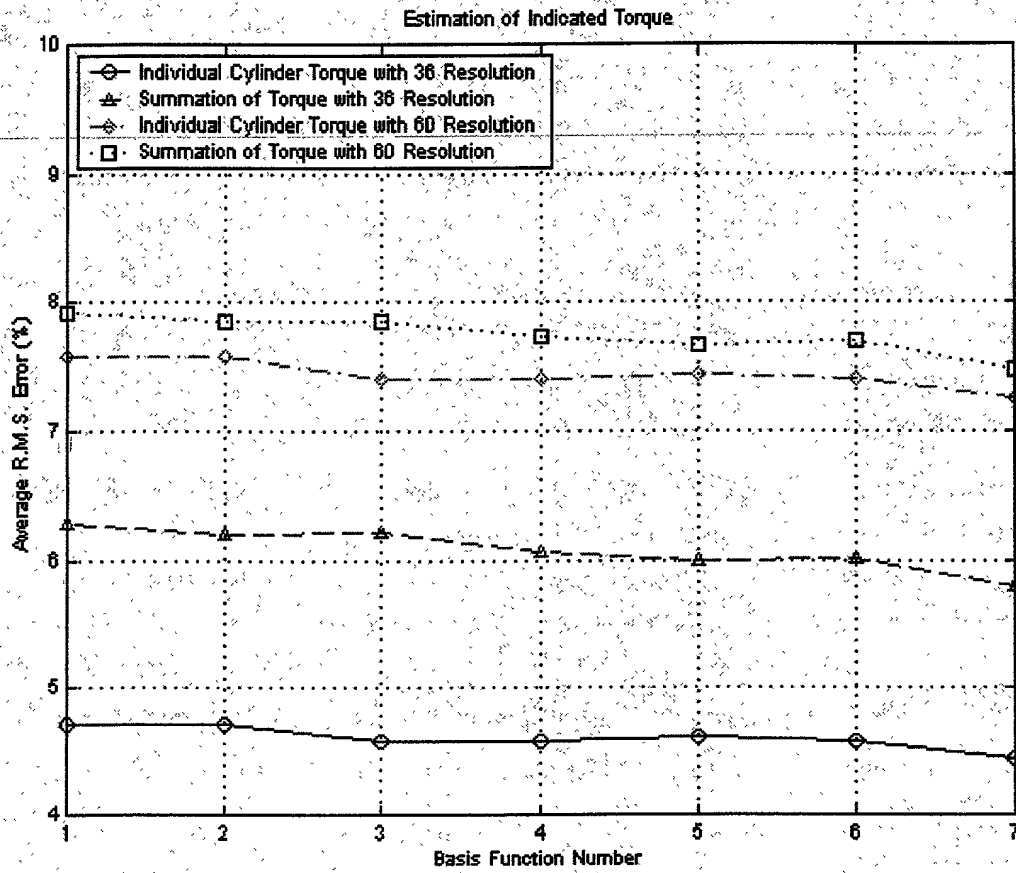


Fig. 10

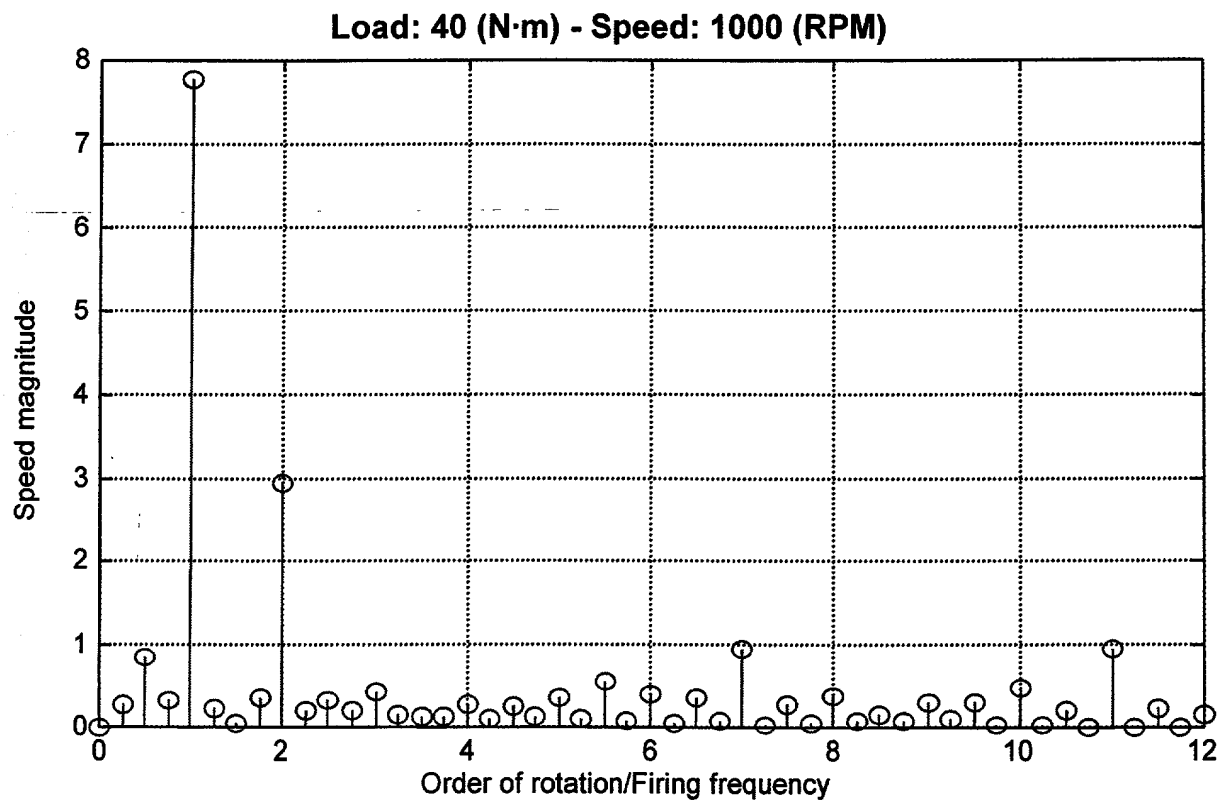


Fig. 11

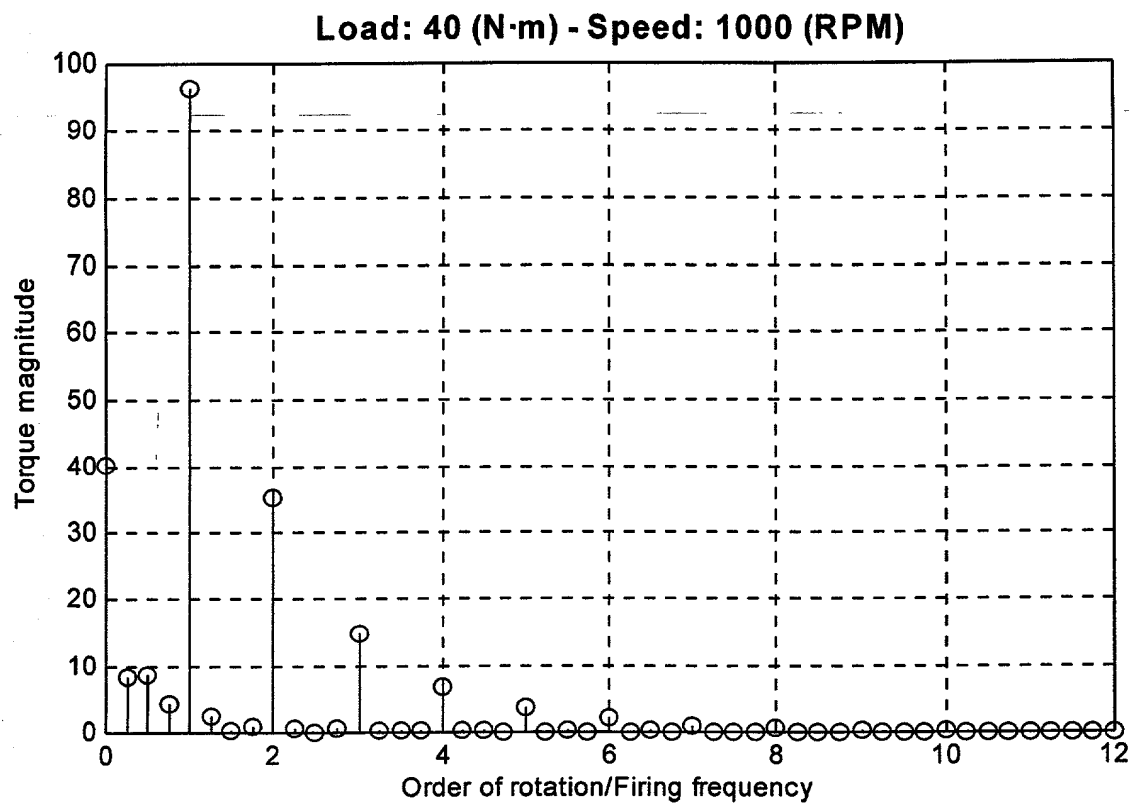
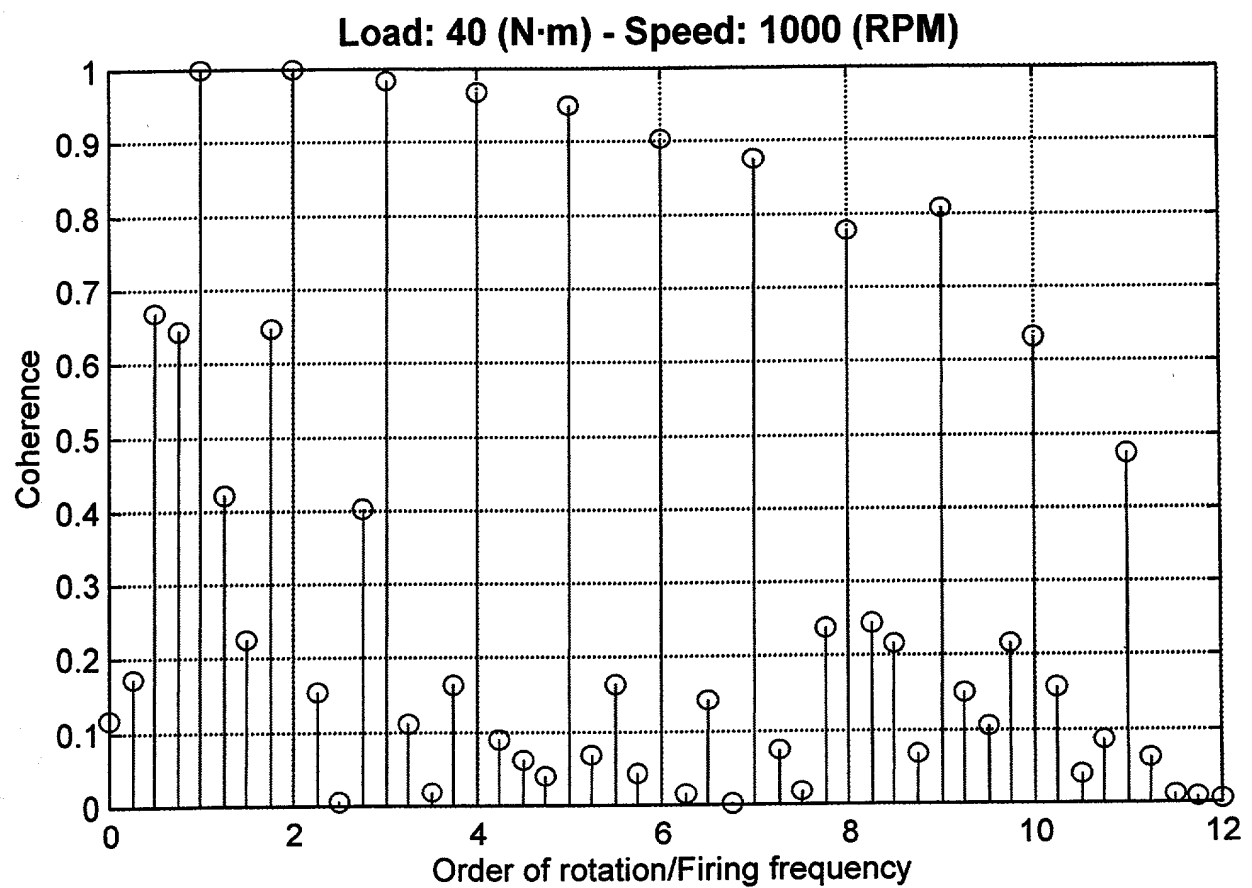


Fig. 12

Fig. 13



**Relationship between average and fluctuating component of torque**

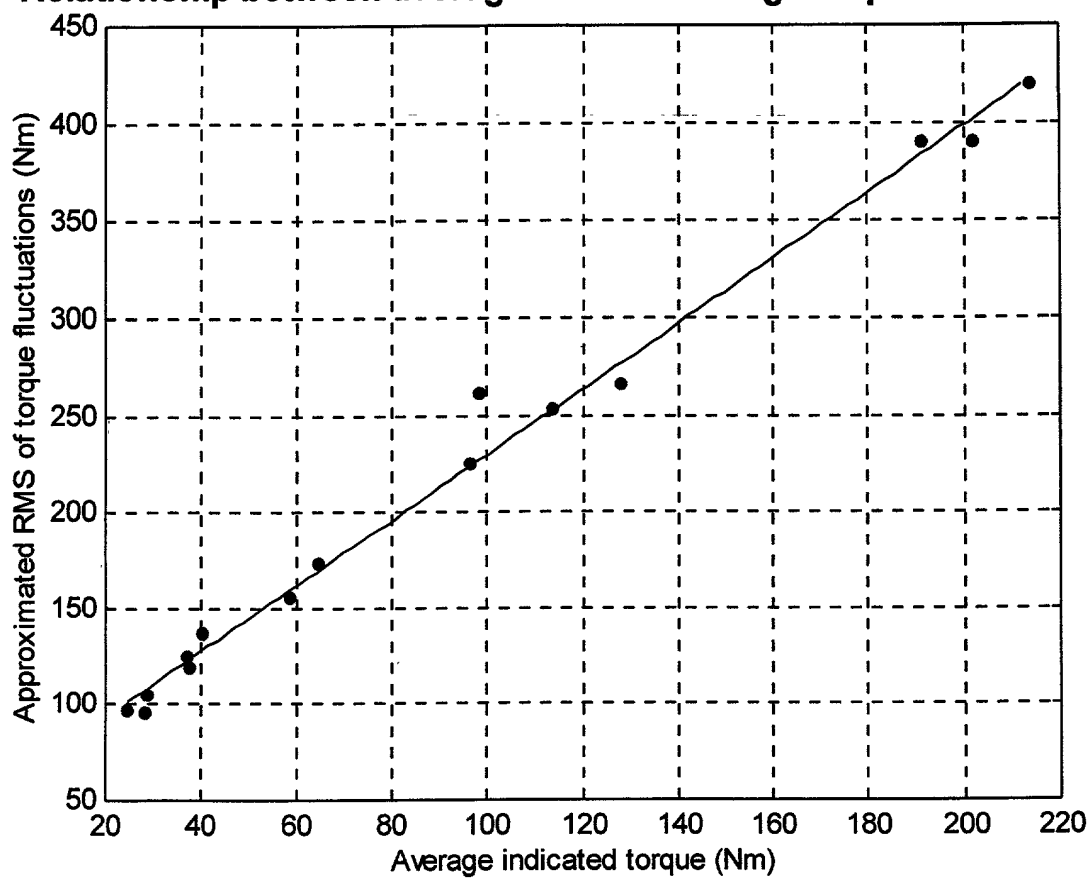


Fig. 14

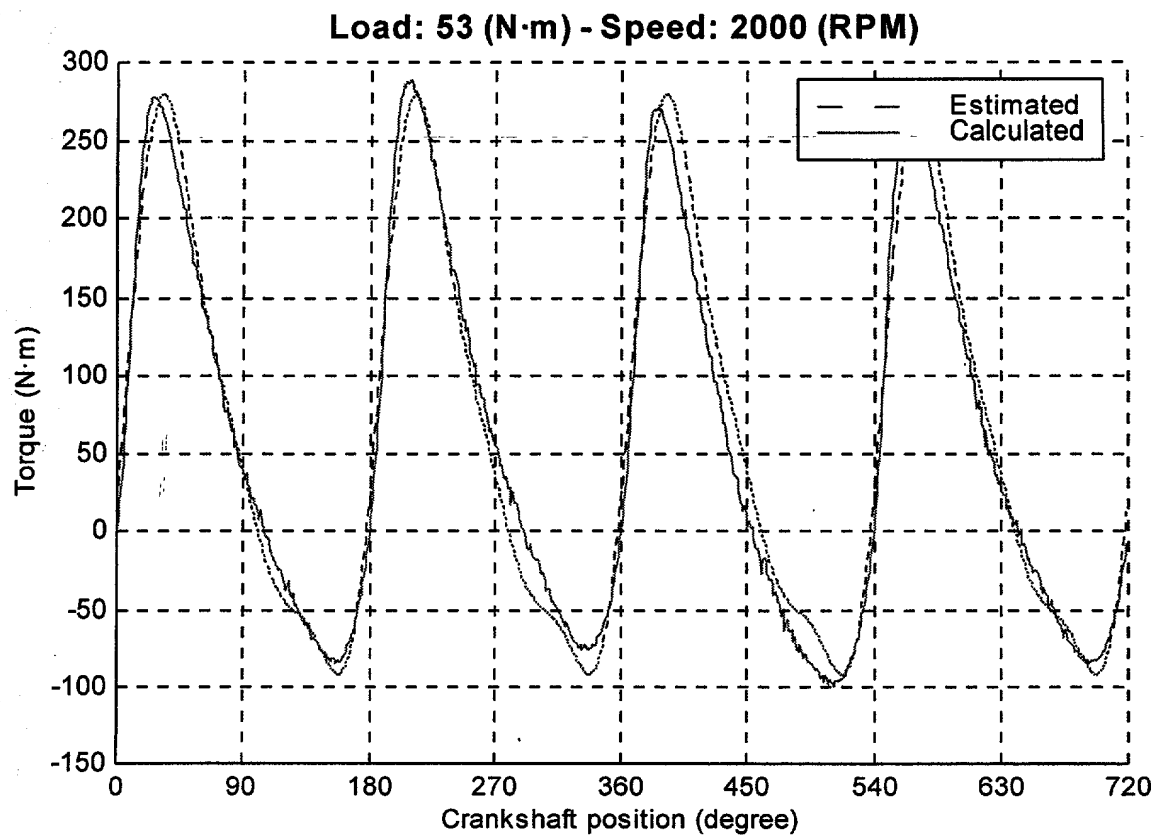


Fig. 15

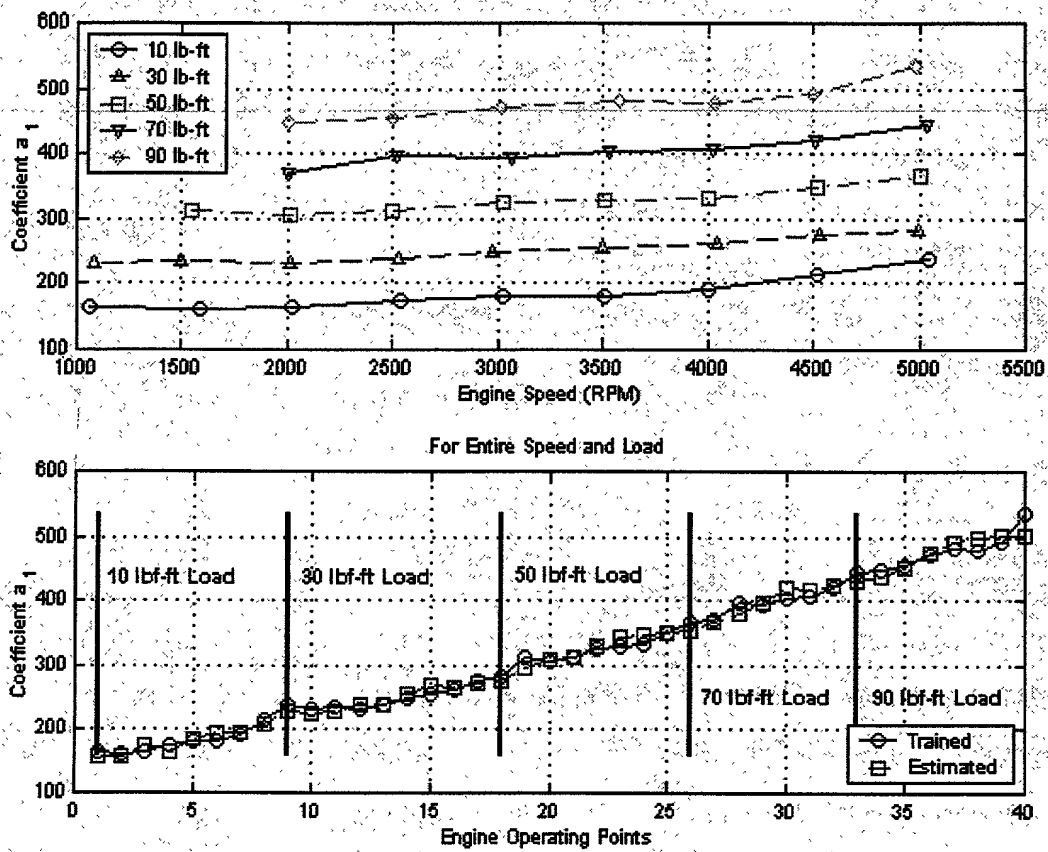


Fig. 16



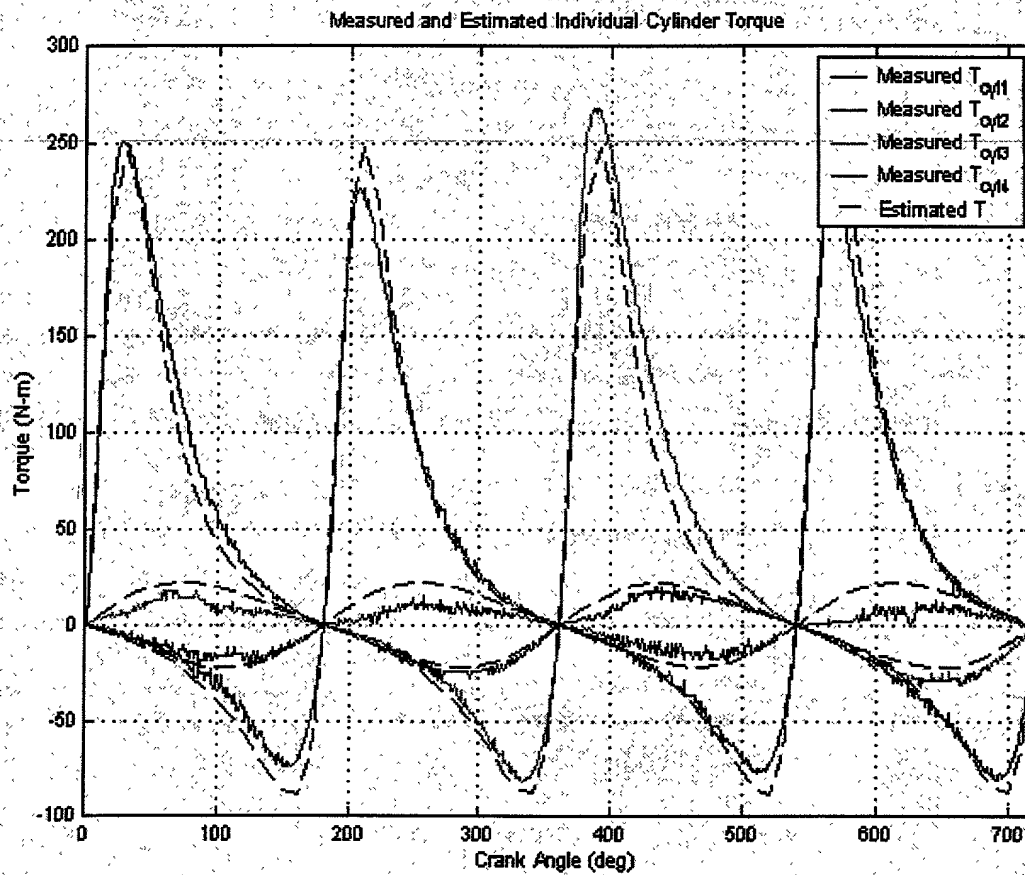


Fig. 17

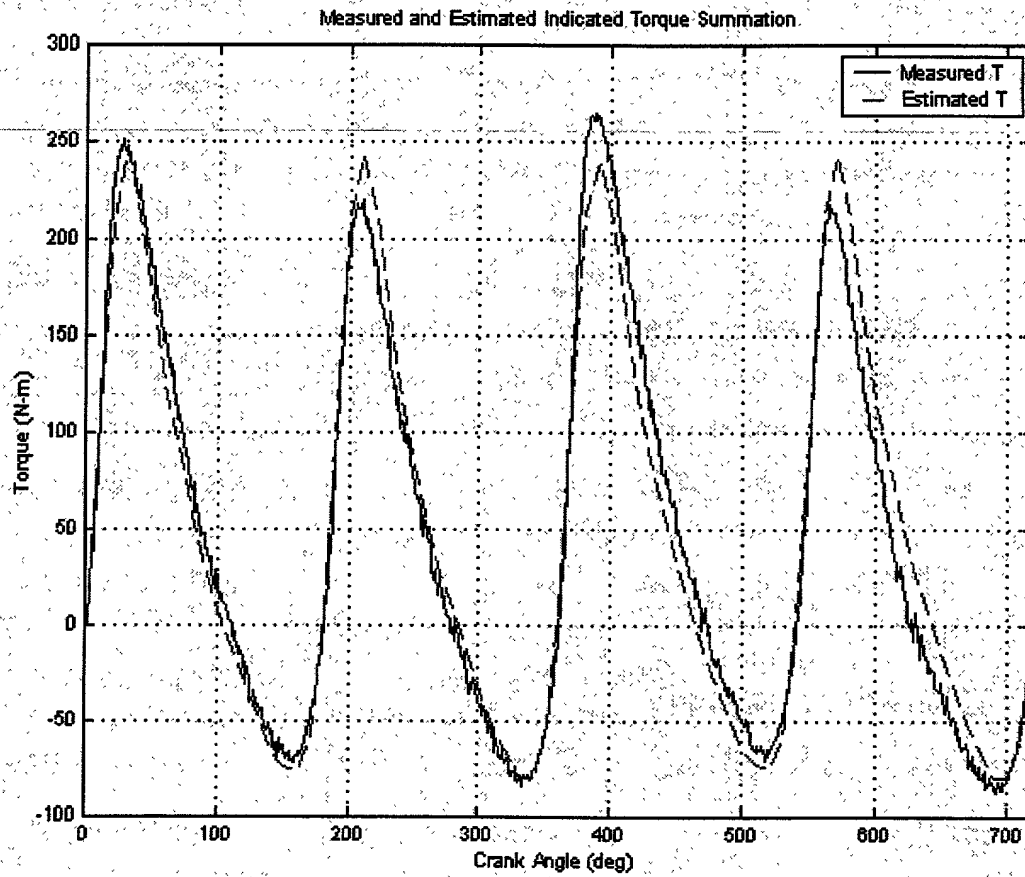


Fig. 18

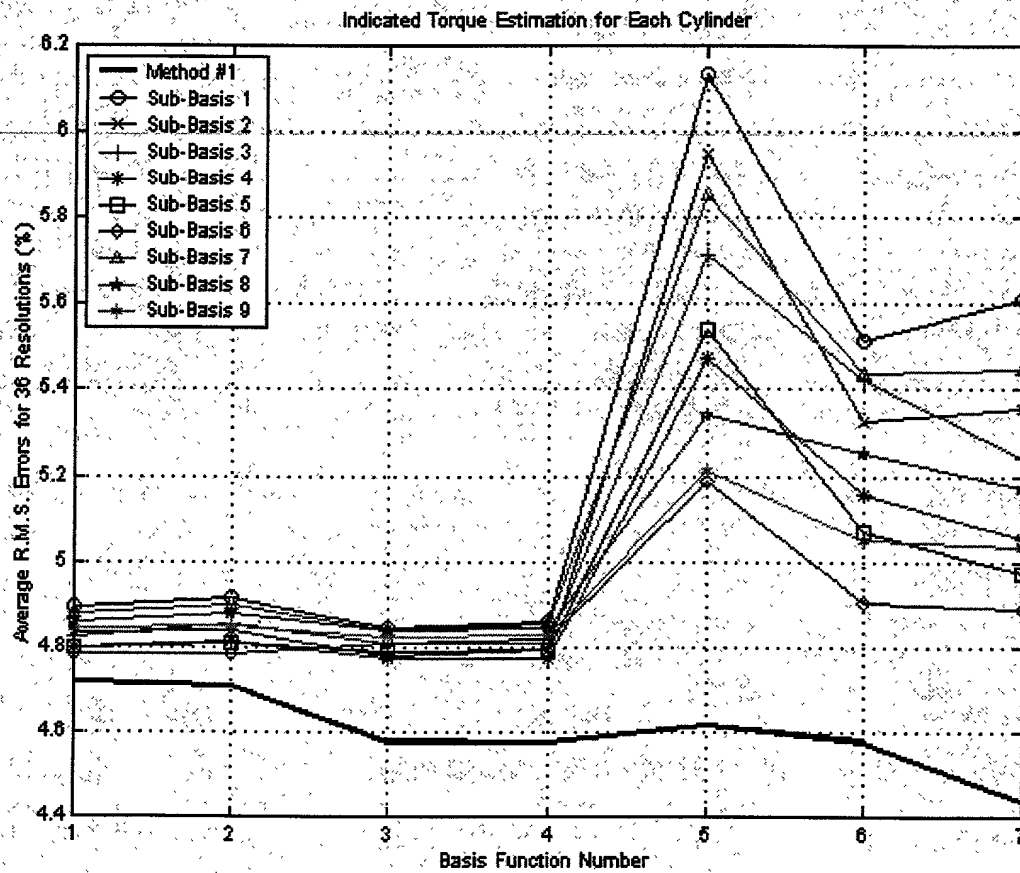


Fig. 19

Real-Time Estimation of Indicated Torque for Individual Cylinders  
@ 1000 RPM and 10 lb-ft

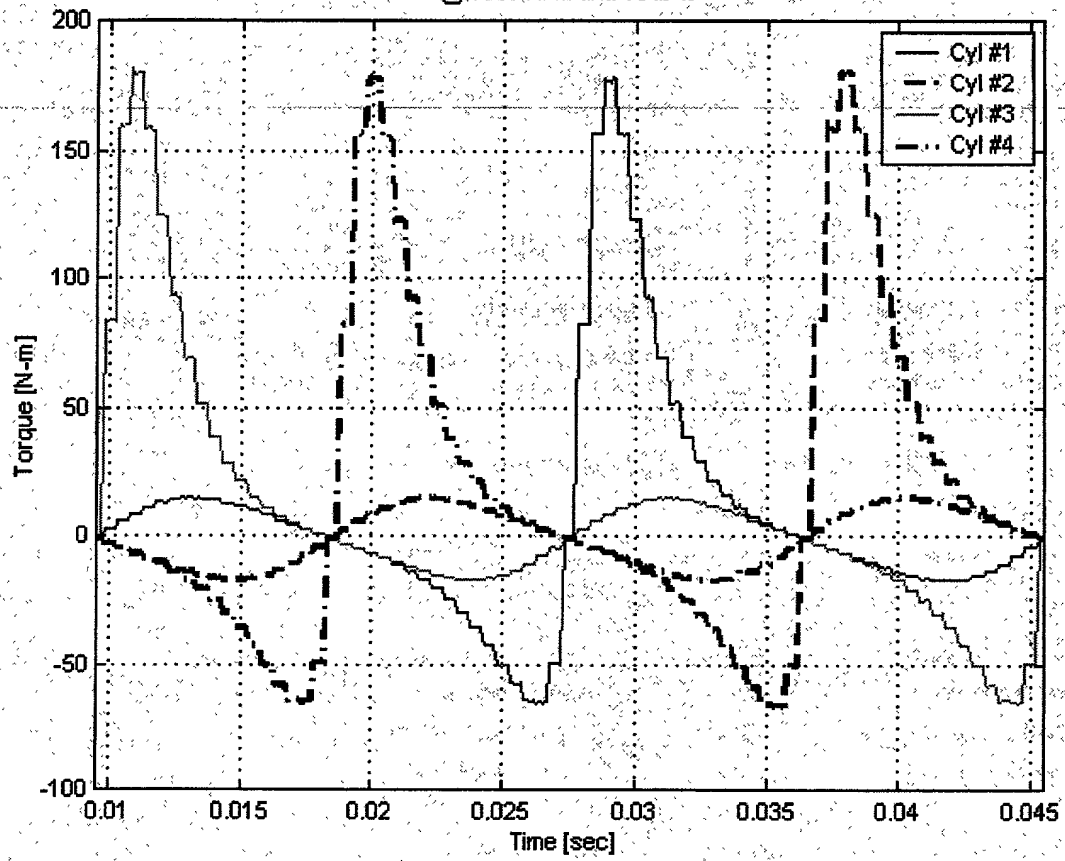


Fig. 20

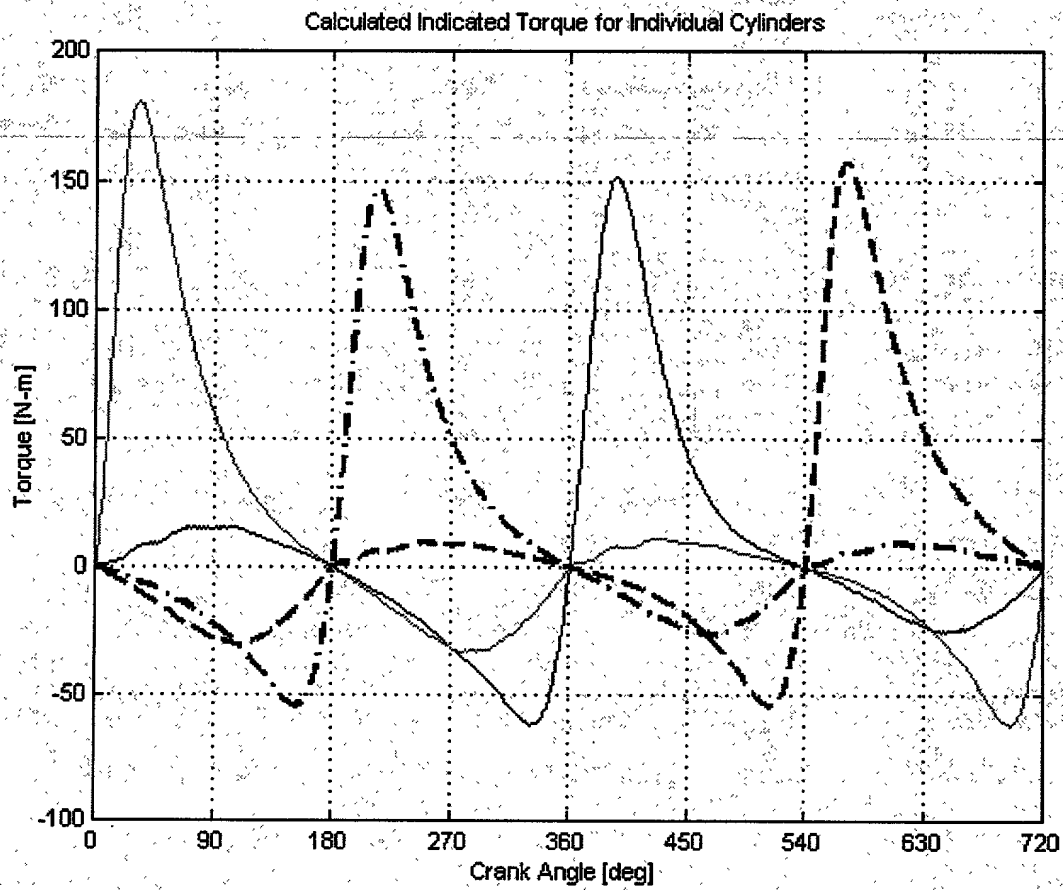


Fig. 21

Real-Time Estimation of Indicated Torque for All Cylinders  
@ 1500 RPM and 30 lb-ft

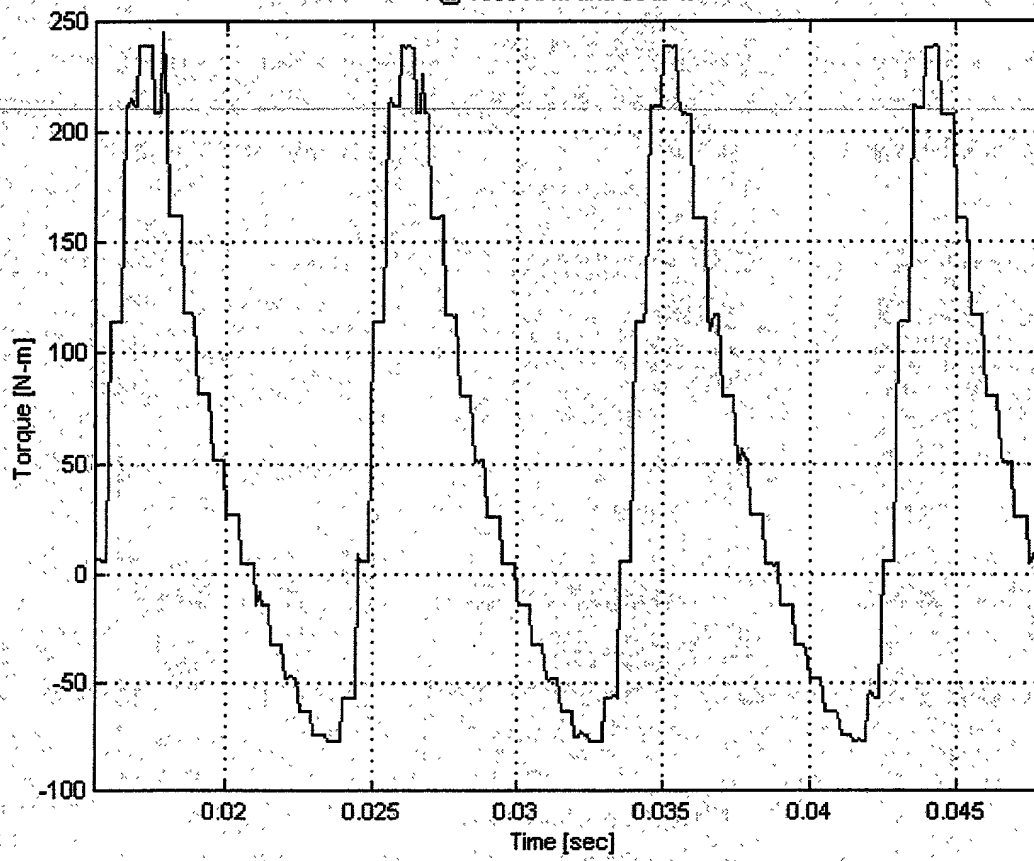


Fig. 22

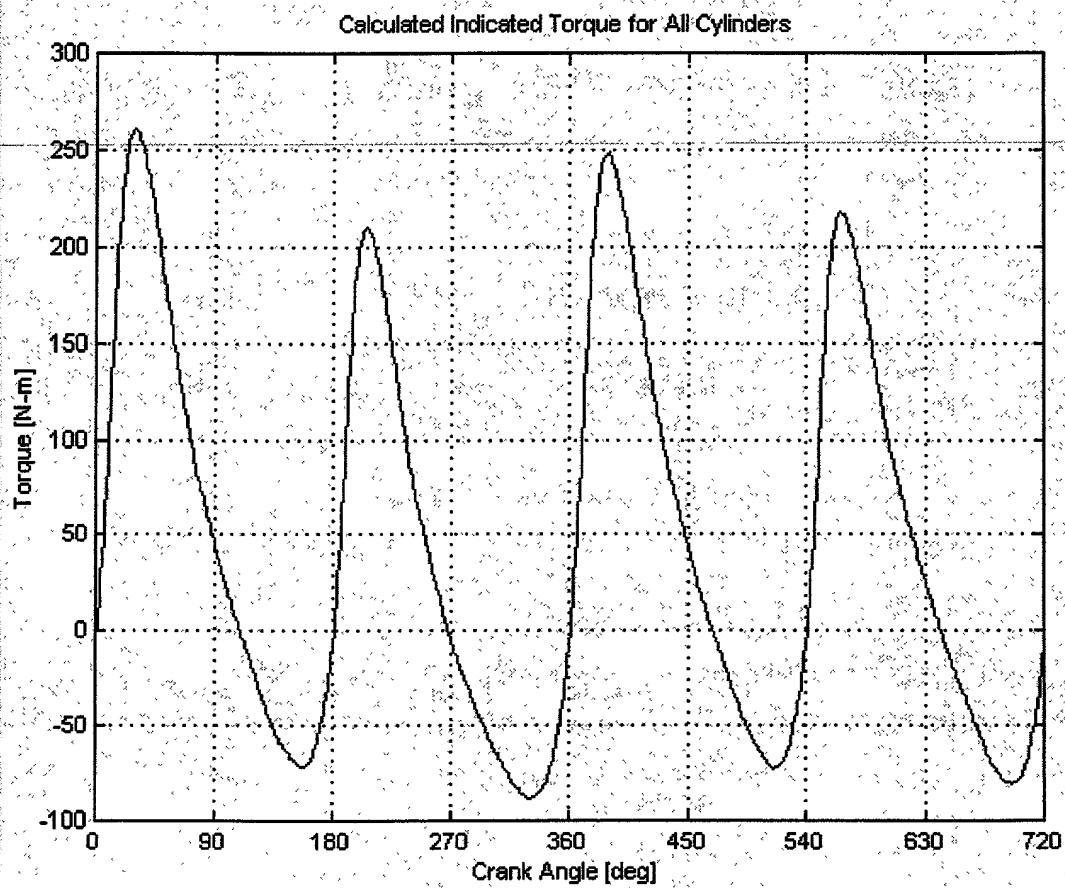


Fig. 23